

WHAT IS CLAIMED IS:

1. A forming tool movement unit for manifold closing machines comprising: a rotating head with forming tools supported thereon that are slidable in mutually opposite radial directions with coordinated movements;  
5 a supporting frame; a supporting element which is slidable in an axial direction on said supporting frame with a stroke that is controlled electronically; a first double-acting actuator having a stem and a body that is coupled to said supporting element so as to be rotatable and, respectively, movable in an axial direction; motor means kinematically connected to said  
10 actuator for turning thereof, said body of the first actuator supporting coaxially and at a front part thereof said rotating head into which the stem of the first actuator extends and is movable with a stroke that is controlled electronically and with the rotating head kinematically connected to said forming tools in order to impose coordinated motion thereof.
- 15 2. The movement unit of claim 1, wherein said first actuator comprises said body that forms internally a cylindrical chamber with a piston therein that is slidable in a sealing manner, said piston being keyed on said stem, and said stem extending through said body, with a front portion thereof that lies in front of said piston and a rear portion thereof that lies behind the  
20 piston.
3. The movement unit of claim 2, wherein said body is rigidly provided with a front sleeve and a rear sleeve for support, said front and rear sleeves being rotatably coupled to said supporting element, said stem passing in a sealed manner through said sleeves, respectively, with said front portion and  
25 with said rear portion.
4. The movement unit of claim 3, wherein said rear portion of the stem forms internally first and second ducts for passage of fluid under pressure, said first and second ducts starting from a free end of the stem and leading into said cylindrical chamber, respectively in front of said piston and behind  
30 said piston.

5. The movement unit of claim 4, wherein said first and second ducts comprise axial portions that start from said rear free end of the stem, and radial portions that lead into respective additional radial portions formed on said piston.

5 6. The movement unit of claim 4, comprising a rotary coupling, said rear free end of the stem being connected with said rotary coupling, which is connected to a distribution unit for pressurized fluid for said first actuator.

7. The movement unit of claim 1, wherein said body of the first actuator is provided with cooling fins.

10 8. The movement unit of claim 4, wherein said first actuator is of the pneumatic type.

9. The movement unit of claim 4, comprising sliding blocks provided at said supporting element, axial straight guides and a second actuator, said supporting element being slidable with said sliding blocks on corresponding  
15 one of said axial straight guides, arranged on said supporting frame, and being connected with said second actuator that is controlled electronically.

10. The movement unit of claim 9, comprising a motorized worm screw arranged in an axial direction and rotatably coupled to said frame, said second actuator being constituted by an internally threaded sleeve, fixed in a  
20 lower region to said supporting element, and which engages with a screw-and-nut coupling thereof said motorized worm screw.

11. The movement unit of claim 9, wherein said second actuator is constituted by a second actuator arranged in an axial direction that has a body fixed to said frame below said supporting element, a head of the stem  
25 being fixed to a lower bracket of, and rigidly coupled to, said supporting element.

12. The movement unit of claim 9, wherein said motor means are constituted by an electric motor and by a transmission that is connected to said body of said first actuator.

30 13. The movement unit of claim 12, wherein said electric motor has a

shaft, a first pulley that is keyed on said shaft, said motor means further comprising a driving belt and a second pulley that is keyed to a rear part of the rear supporting sleeve of the first actuator, in order to tension said driving belt.

5        14. The movement unit of claim 13, wherein said electric motor is arranged on corresponding supporting brackets of, and which protrude below, said supporting element, under said second actuator.

15        15. The movement unit of claim 14, wherein said supporting element is constituted by a box-like body in which said body of the first actuator is arranged, said front and rear supporting sleeves of said first actuator being  
10        rotatably coupled respectively on front and rear walls of said body, said head and said second pulley being fixed, respectively, to said front and rear sleeves, which are arranged externally with respect to said supporting element.

15        16. The movement unit of claim 1, comprising a transverse pin fixed to the head of said stem of the first actuator, sliders arranged at the ends of said transverse pin, and spaced plates slidable transversely in mutually opposite directions within said head, said head being provided, at a front part thereof, with said forming tools, which are fixed to corresponding ones of said facing  
20        spaced plates, said spaced plates comprising respective slotted holes which are arranged diagonally opposite and to each other, corresponding ones of said sliders engaging said slotted holes.

25        17. The movement unit of claim 16, comprising force reducing means arranged on said rotating head for reducing force required for radial movement of said forming tools, said force reducing means consisting of  
30        four plate-shaped bodies, which have at least one slot with a stroke limiter, and pins rigidly coupled to said plates and slidable within said at least one slot, said plate-shaped bodies being arranged slidingly in pairs at inner sides of said rotating head and symmetrically to said slider and being coupled in pairs to said plates by way of said pins.